CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.08/KRIDL/CEMENT/2014-15

Date: 19.07.2014

TEST REPORT

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager**, KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
SAMPLE ID	:	Cement
SAMPLES SUPPLIED BY	:	AGENCY

The results of the tests conducted on the cement sample are as follows:

Sl.No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-1989
1	a) Initial Setting Time	IS-4031 (Part -5)	150 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5)	485 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part 3) by the Le-Chatelier method	1 mm	Not more than 10 mm
3	Standard Consistency	IS-4031 (Part -4)	26.00 %	-

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SAND/2014-15 : 19.07.2014

TEST REPORT ON FINE AGGREGATES (SAND)
IS 383-1970 (RA- 2002)

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Date of Testing : 19.07.2014

Material : Sand Total Wt. of Aggregates in gms **2000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits For Zone-II
10	0	0	0	100	100
4.75	112	5.60	5.60	94.4	90-100
2.36	208	10.40	16.00	84.0	75-100
1.18	515	25.75	41.75	58.3	55-90
600 Micron	429	21.45	63.20	36.8	35-59
300 Micron	475	23.75	86.95	13.1	8-30
150 Micron	213	10.65	97.60	2.4	

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Job No.: CTCE/BBMP/W.No.08/KRIDL/AGG/2014-15 : 19.07.2014

TEST REPORT ON COARSE AGGREGATES
IS 383-1970 (RA- 2002)

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Date of Testing : 19.07.2014

Material : 40mm Aggregates

Total Wt. of Aggregates in gms **25600**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits
80	0	0	0	100	100
40	997	3.89	3.89	96.11	95-100
20	15633	61.07	64.96	35.04	30-70
10	5746	22.45	87.41	12.59	10-35
4.75	2784	10.88	98.28	1.72	0-5

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Job No.: CTCE/BBMP/W.No.08/KRIDL/Gradation/2014-15

19.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Date of Testing : 19.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **26000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	990	990	3.8	96.2	95-100
22.4	6635	7625	29.3	70.7	60-80
11.2	5585	13210	50.8	49.2	40-60
4.75	4270	17480	67.2	32.8	25-40
2.36	3965	21445	82.5	17.5	15-30
0.600	2150	23595	90.8	9.3	8-22
0.075	2120	25715	98.9	1.1	0-8

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Job No.: CTCE/BBMP/W.No.08/KRIDL/STEEL/2014-15 19.07.2014

TEST REPORT ON REINFORCEMENT STEEL

Client	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager**, KRIDL, Bangalore.
Name of the work	:	Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Date of Test	:	19.07.2014
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm²	Tensile strength (Ultimate stress) N/mm²	Elongation percent gauge length		
1	10	0.62	513	550	13.10	O.K	O.K

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Job No.: CTCE/BBMP/W.No.08/KRIDL/CUBE/2014-15 29.07.2014

TEST REPORT ON CONCRETE CUBES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of the work	: Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Sample ID	: Drain Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete	: M_{20}
Compressive Strength as on	: 7^{th} day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	22.07.2014	29.07.2014	8.163	328.6	14.60
2	22.07.2014	29.07.2014	8.297	352.3	15.66
3	22.07.2014	29.07.2014	8.358	362.9	16.13

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Bitumen/2014-15 24.07.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
SAMPLE I/D	Roads and Drains at Kodigehalli Village and Kodigehalli Layout in Ward No.08
DATE OF TESTING	24.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	475
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	25.00
7. Bitumen content in %	5.20	5.00
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	38.52	8.13	8.13	91.87	90-100
4.75	265.9	56.10	64.22	35.78	35-51
2.36	54.23	11.44	75.66	24.34	24-39
1.18	37.48	7.91	83.57	16.43	15-30
0.3	28.96	6.11	89.68	10.32	9-19
0.075	27.87	5.88	95.56	4.44	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	42.56	8.96	8.96	91.04	90-100
4.75	264.3	55.64	64.60	35.40	35-51
2.36	52.87	11.13	75.73	24.27	24-39
1.18	41.56	8.75	84.48	15.52	15-30
0.3	25.69	5.41	89.89	10.11	9-19
0.075	26.58	5.60	95.49	4.51	3-8

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/Gradation/2014-15

19.07.2014

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Date of Testing : 19.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7805**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	135	135	1.7	98.3	95-100
22.4	2510	2645	33.9	66.1	60-80
11.2	1205	3850	49.3	50.7	40-60
4.75	1000	4850	62.1	37.9	25-40
2.36	995	5845	74.9	25.1	15-30
0.600	870	6715	86.0	14.0	8-22
0.075	770	7485	95.9	4.1	0-8

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20.07.2014

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Date of Testing : 20.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8080**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	235	235	2.9	97.1	95-100
22.4	2510	2745	34.0	66.0	60-80
11.2	1310	4055	50.2	49.8	40-60
4.75	1080	5135	63.6	36.4	25-40
2.36	985	6120	75.7	24.3	15-30
0.600	865	6985	86.4	13.6	8-22
0.075	760	7745	95.9	4.1	0-8

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/Gradation/2014-15 20.07.2014

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : **AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014**

Date of Testing : 20.07.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **7555**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	130	130	1.7	98.3	95-100
22.4	2455	2585	34.2	65.8	60-80
11.2	1250	3835	50.8	49.2	40-60
4.75	990	4825	63.9	36.1	25-40
2.36	855	5680	75.2	24.8	15-30
0.600	815	6495	86.0	14.0	8-22
0.075	710	7205	95.4	4.6	0-8

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/Gradation/2014-15

21.07.2014

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : **AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014**

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8255**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	260	260	3.1	96.9	95-100
22.4	2510	2770	33.6	66.4	60-80
11.2	1300	4070	49.3	50.7	40-60
4.75	1085	5155	62.4	37.6	25-40
2.36	980	6135	74.3	25.7	15-30
0.600	890	7025	85.1	14.9	8-22
0.075	780	7805	94.5	5.5	0-8

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/AIV/2014-15 19.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	19.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.02	22.22	
	100* (W_2/W_1)%			22.12

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/S-T/2014-15 19.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager**, KRIDL, Bangalore.
Name of Work	Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	19.07.2014

Result : Flakiness Index = **11.56%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.81%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/AIV/2014-15 24.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.30	21.50	21.40

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Shape_T/2014-15 : 24.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 24.07.2014

Result : Flakiness Index = **12.35%**

Elongation Index = **13.50%**

Result : Combined Flakiness & Elongation index **25.85%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Stripping/2014-15

24.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer**, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager, KRIDL, Bangalore.**
Name of the work	Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.07.2014

Type of binder : 80/100

Percentage of binder used : 5.0% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.0 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Sp_Wa/2014-15 24.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	24.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2025	2020	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1270	1265	
4	Weight of saturated surface dry aggregate in air	W_3 g	2014	2015	2016	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	747	745	751	
6	Weight of oven dried aggregate	W_4 g	2002	2000	2001	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.680	2.685	2.664	2.676
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.724	2.740	2.719	2.727
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.60%	0.75%	0.75%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.08/KRIDL/CUBE/2014-15

19.08.2014

TEST REPORT ON CONCRETE CUBES

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of the work : Improvements to Roads and drains at Kodigehalli village and Kodigehalli Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KG/(WO)/59/2014-15 Dated: 18.07.2014

Sample ID : Drain Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	22.07.2014	19.08.2014	8.139	478.3	21.26
2	22.07.2014	19.08.2014	8.237	485.6	21.58
3	22.07.2014	19.08.2014	8.310	510.2	22.68

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Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

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Cross Sectional Area : 22500 mm^2

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Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	22.07.2014	19.08.2014	8.198	475.5	21.13
2	22.07.2014	19.08.2014	8.280	498.6	22.16
3	22.07.2014	19.08.2014	8.398	515.6	22.92

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